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International Workshop on Health Behavior Change and Maintenance

- **What do you think are the 'necessary ingredients' to develop models of health-related behavior that can account for momentary, short-term and long-term behavior change?**

    a) A mutual understanding language: There is no such thing as *health* and *non-health* behaviors. If we are alive and have a heartbeat, there is something to be observed and measured. Separating life and health is not an option, therefore developing models should not bias capture and modeling of behavior to what we consider health-related. Typing this text on my computer is not considered health-related, but it is, especially if I am found sitting for long periods of time without having eaten, or rested.

    b) A mutual understanding of scope: Efforts toward measuring change must encompass both the visible and invisible, the conscious, subconscious and even unconscious brain, body and mind, regardless of our understanding of impact and meaning of such behaviors. How this will be achieved is not known or easy, but instead of focusing on what we can do based on limitations, we have to start with what is necessary to understand.

    c) A mutual understanding of states: Change is constant and if we aren't seeing it, it just means we aren't measuring it. Unless we can prove with absolute certainly that *nothing* is changing, we should be measuring *something* or the absence of it. Interaction design is often driven by the presence of behavior, but one must account for design for what happens when *nothing* is happening, or *when* what we know nothing about *is* happening.

- **What is the nature of timing of measurement and information delivery on the effectiveness of feedback delivered by new dynamic systems, and how might a technical system maximize engagement and impact by manipulating the timing of information delivery?**

    Assuming a prevention/intervention framework, instead of "watchful waiting", we should adopt a developmental framework, in which a system can always be observed and in which individuals interact with system, more or less as needed in increasingly sophisticated ways. As the system develops its own "consciousness", it can initiate more contact in order to learn and validate its knowledge and later on to cooperate and empathize with the individual, simulating a securely attached relationship, much like a child and adult develop a relationship.

The human brain is the best example of an interactive system that develops sensory pathways, language, executive function in a spiral that hopefully reaches advanced theory of mind and self concept. Each experience we have with our environment (things, people and places) creates a connection; circuits become more complex as interactions become more complex. The timing of capture and interaction may try to mimic what humans are already most familiar with, therefore a technical system that interacts with an individual could engage them in the most natural and familiar way possible.

As for impact, our bodies are quick to adapt to things that don't work, sometimes to a detriment. A system that captures and models human behavior has the potential to become a virtual mirror of the self: we may not always know what we are looking at, but having a mirror is generally useful. This brings up an important problem: holding a broken mirror up to a person or holding up a mirror to a person who has a distorted sense of self reveals the real and ethical implications of presenting people with their own data. Who will design compassionate, empathic "mirrors" who can ask for validation of data in a non-judgmental way, checking to see if it is a good time to ask whether you actually had five chocolate popsicles yesterday because you are angry, depressed or because your thyroid is underactive?

- **How should systems designed to work for years be evaluated if they depend on technology that may change at a much more rapid pace?**

The challenge of technology pace being misaligned with research will never go away. Our job is to find optimal ways to combine the goals of our research with available technology. A common design approach to take into consideration is to "over-design" beyond what is currently possible and implement what is feasible instead of the other way around. By imagining the future without restriction of what is possible now, we can influence the development o f technologies. This "over-design" should describe what kinds of interactions are necessary to capture and what interactions with individuals may be in a generalized and more abstract manner. For example, we can't accurately capture nutrient information of each and every meal we have. Currently, there are a number of ways that can be done with various ease and reliability and depending on study burden, we may opt for one method over another. A system for capturing food intake should first be described in a general way and gradually break down into more detailed necessary information. At minimum, we could capture a state change: food was consumed. Then possibly quantity, followed by quality: protein, carbs, fat, other, possibly followed by a further breakdown of types of carbs, fat, etc. We currently can capture a subset of these things based on scanning barcodes of packaged foods. The nutrition data labeling system is flawed and therefore our design has to work through which data can be reliably and easily captured into a food intake tracking system. In a distant

future, we may be able to stick a sensor in our food or implant a tracker in our stomach to capture all that data ranging from quantity to quality, but for now we have to focus on a well-designed model of describing food intake in the most useful and hierarchically complex model, which technology could intersect with in a number of ways.

- **What could participants in the meeting collectively do before, during, and after the meeting to significantly impact the field of health behavior change and maintenance? Be as concrete as you can, and think boldly.**

  In the spirit of practicing what we preach, participants should try to track at least one or more behaviors of their own world for as long as possible and be ready to discuss their case study challenges, insights and limitations. Although objectivity is very important, design requires an intimacy with a given problem from multiple angles and at various altitudes. We should be able to describe a problem using first-hand experiences, as well as aggregate data or empirical data. Neither approach should be preferred over another at these early stages of development. **Bring your own personal data experiment to the table.**

  In the spirit of transdisciplinarity, participants should teach other how to see data and behaviors from the other's point of view. We all have our reasons for doing what we do and our passions for pursuit of certain areas of knowledge, but this opportunity should enable us to start seeing what someone else is seeing looking at our designs of models, systems, data, theory, etc. As students of each other, I would like to have an opportunity to understand at least one more person's area of interest in more than an elementary way. Although I value discussion very much, we should come prepared to solve at least one problem that each other has in a hands-on experience. **Bring your own model, system, dataset, theory to the table with a question and challenge and let someone work through it with you.**